

Publisher's notice

This *Tourism Economics* Fast Track paper has been peer-reviewed, revised and fully accepted for publication in *Tourism Economics*. However, this is an **unedited manuscript** and will undergo a rigorous editing process before its appearance in an issue of the journal. This means that this manuscript version of the paper may not conform to journal style in terms of presentation, spelling and other usages. It may also contain minor errors of typography, grammar, spelling, referencing, etc, all of which will be corrected in the processes of copy-editing and proofreading.

Tourism Economics operates a Fast Track online publication system so that papers can be published and made available almost immediately on final acceptance by the journal.

Citing this article

Each *Tourism Economics* Fast Track article is given a DOI. When the paper is assigned to an issue, this DOI will automatically be transferred to the article in the journal issue.

This version of the article may be cited using the DOI. Citations should include the author's or authors' name(s), the title of the article, the title of the journal followed by the words 'Fast Track', the year of Fast Track publication and the DOI. For example:

Smith, J. (2016), 'Article title', *Tourism Economics* Fast Track, DOI xxxxxxxx.

Once the paper has been published in an issue of the journal, the DOI will automatically resolve to that final version and the article can be cited in accordance with normal bibliographical conventions.

Article copyright © 2016 IP Publishing Ltd.

doi: 10.5367/te.2016.0555

Is hotel efficiency necessary for tourism destination competitiveness?

An integrated approach

Luis Felipe Mendieta-Peñalver
Department of Economics
Faculty of Economics, Business and Tourism
University of Alcala
Plaza de la Victoria, 2
28802 Madrid, Spain
luis.mendieta@uah.es

José F. Perles-Ribes
Applied Economic Analysis Department
University of Alicante
Campus S. Vicente Raspeig
03690 Alicante, Spain
University of Alicante
jfperles@ajcalp.es

Ana B. Ramón-Rodríguez
Applied Economic Analysis Department
University of Alicante
Campus S. Vicente Raspeig
03690 Alicante, Spain
anar@ua.es

María J. Such-Devesa (corresponding author)
Department of Economics
Faculty of Economics, Business and Tourism
University of Alcala
Plaza de la Victoria, 2
28802 Madrid, Spain
mjesus.such@uah.es

Is hotel efficiency necessary for tourism destination competitiveness?

An integrated approach

ABSTRACT

This study investigates the relationship between tourism destination competitiveness and the competitiveness of international hotel firms using an integrated approach based on Porter (1990). A mediation model is employed to link destination competitiveness, efficiency and firm competitiveness. Global technical efficiency (GTE), pure technical efficiency (PTE) and scale efficiency (SE) are estimated through data envelopment analysis (DEA) techniques. The results confirm a positive relationship between destination competitiveness and firm competitiveness, but efficiency does not play a mediating role linking both.

Keywords: competitiveness, international hotel chains, mediation models, technical efficiency and scale efficiency, data envelopment analysis (DEA)

INTRODUCTION

The theoretical relationship between destination and firm competitiveness was originally proposed by Porter (1990) who clearly established that there are no competitive territories, only competitive companies (or sectors, clusters) located within them. In this sense, and in relation to the endogenous or local development, territories conceived in this way constitute active agents facilitating the development and international success of the firms operating within them.

Efficiency (see Figure 1) plays a key role in this context as it is precisely the greater or lesser degree of efficiency with which the resources of the economy are exploited, that would determine the level of international success of the companies located therein (Porter 1990).

Operationalizing competitiveness as an input-output evaluation has recently been analysed by Knezevic et al. (2016) following Porter's new contributions in Porter *et al.* (2008) and Delgado *et al.* (2012). Within this context there are a number of studies that link efficiency with competitiveness, also in terms of tourism.

Crouch (2006) applied this same idea to tourist destinations when distinguishing between competitive and comparative advantages in the following terms: competitive advantages are those that have been established as a result of effective use of the resources. In this case, the competitiveness of a tourism destination depends on how well a destination utilizes its available resources i.e. how well it creates added value.

Efficiency measures are used. Admittedly, destination competitiveness is a more complex notion, but we can use efficiency measures of resource-use productivity to relate business competitiveness with destination competitiveness. Also, the Happy Planet Index Report (2013), incorporates a country's efficiency measures as one of its competitiveness criteria.

Figure 1 about here

Many authors focus exclusively on analyzing efficiency on the firm level, mainly the hotel sector (see, for example, Morey and Dittman 1995; Johns et al. 1997; Barros 2005, Barros and Santos 2006). The classic typology of these studies implies the establishment of the inputs and outputs, calculating the different efficiency measures and establishing a classification of firms in terms of the results obtained.

Other authors contemplating territories and firms and identifying efficiency with competitiveness estimate the efficiency of tourism destinations (see for example, Bossetti et al. 2006 or Cracolici et al. 2006) and establish the efficiency/competitiveness rankings of the destinations studied. Only a few authors have taken a step beyond this conventional approach of calculating efficiency measures and have attempted to relate efficiency to the determinants of destination competitiveness (see for example, Barros et al. 2011), or to the market orientation of the countries of origin of the tourists (see Zhang et al. 2016). However, these studies are the exception. To date, there are no studies that have tested the complete relationship proposed by Porter between

destination competitiveness and firm competitiveness in tourism.

This study analyses, following Porter (1990), the relationship between destination competitiveness and firm competitiveness for several international hotel chains.

Specifically, our research questions are:

- 1) Does a relationship exist between destination competitiveness and the hotel firm competitiveness of that destination?
- 2) Does efficiency play a mediating role between destination competitiveness and hotel firm competitiveness?

Additionally, this paper demonstrates differences in efficiency between these chains that arises from a set of variables: level of internationalization, property structure, geographic growth strategy, and specialization within a particular market segment (i.e., luxury, upscale, midscale, or budget/economy) in contrast to multi-brand positioning. However, the most innovative feature of this study is that it analyses tourism competitiveness using an integrated perspective, connecting destination and firm competitiveness by efficiency in a unified framework.

The remainder of the paper is structured as follows. The next section reviews the relevant literature in the field of tourism competitiveness and justifies the indicators selected for measuring competitiveness both on a macro and micro level. Furthermore, a brief review of some of the most relevant studies analyzing efficiency in the hospitality

sector is presented. The third section explains the methodology used and lists the efficiency indicators considered for the analysis. Section 4 describes the data and estimates the levels of efficiency. Section 5 presents the econometric analysis and results. Finally, the most relevant conclusions are discussed, together with the implications and limitations of this study.

LITERATURE REVIEW

DEFINITION AND MEASURES OF TOURISM COMPETITIVENESS

According to Porter (1990) principal economic goal of a nation is to produce a high and rising standard of living for its citizens. The ability to do so depends not on the fuzzy notion of 'competitiveness', but on the productivity with which a nation's resources (labour and capital) are employed. Productivity is the value of the output produced by a unit of labour or capital. Productivity depends on both the quality and features of products and the efficiency with which they are produced. So to sustain a competitive advantage over time, firms must provide higher-quality products and services or producing more efficiently. This translates directly efficiency into productivity growth.

International competitiveness is a controversial concept which has generated a great deal of debate. Chudnovsky and Porta (1990) distinguished between those approaches focused on the firm which sometimes is extended to the country (Mathis et al. 1988; Michalet, 1981); others focused on the capacity of a national economy in international trade (Chesnais 1981) and finally more complex approaches are defined not only in

terms of international trade but also in terms of economic wellbeing of the citizens of a territory (Scott and Lodge 1985; Fajnzylber 1998).

While the concept is fairly easy to apply to the microeconomic or corporate level, the implementation of the concept on a macroeconomic or territorial scale is much more complex. Therefore, for some authors, the competitiveness of a national economy is synonymous with the competitiveness of its firms, for others, this relationship is not so clear and the interactions involved are much more complex (Chudnovsky and Porta 1990).

Without a doubt, one of the strands in the debate which has been most discussed is based on the ideas of Porter (1990) and in accordance with the paradigms of structural (OCDE 1992) and systemic (CEPAL 1999) competitiveness. It considers that national competitiveness depends not so much on the resources of the territory but on the productivity and efficiency with which a nation's resources are exploited. From this perspective, the structural characteristics of an economy must be considered as determining factors of the competitiveness of the firms operating within it.

In the case of tourism, competitiveness is a relative and multidimensional concept which can be associated to four different perspectives: comparative advantages or competitiveness through pricing, a strategic or direction perspective, a historical or socio-cultural perspective and the development of national competitiveness indicators (Spence and Hazard 1998). Applied to the firm level, competitiveness can be defined as the ability of a firm to design, produce and or market products superior to those offered

by competitors, considering the price and non-price qualities (D'Cruz and Rugman 1992). Applied to destinations, competitiveness seems to be linked to the capacity of a destination to provide goods and services that are superior in aspects valued by tourists to those offered by competitor destinations (Dwyer and Kim 2003).

Based on Porter (1990), Marco et al. (2014) analyses territory impact on the performance of vacation hotels. However, from a spatial viewpoint, there is no optimal and universal model of competitiveness that can be applied to all destinations. Neither is there a generally accepted measure of competitiveness (Omerzel and Mihalic, 2008). D'Hautesserre (2000) defines the competitiveness of a tourism destination as its capacity to maintain its position (market share) or improve it over time. He establishes that one way to determine the success of a destination is to analyze its direct performance in the markets through a market share analysis. In any case, the use of market share as an indicator of destination competitiveness is not exempt from debate and authors such as Croes (2011) maintains that market share is an incomplete yardstick because it is not appropriate for all destinations (e.g. is not appropriate for most island destinations due to its relatively small share of the global/regional market).

Less controversy surrounds market shares as a measure of competitiveness at firm level. In fact, the most popular indicators of marketing effectiveness and competitive advantage are market share and profitability (Lall 2001). However, for some authors, the use of this indicator is also based on a simplistic conception of competition, since in reality competition is played out over many time periods within evolving markets, and there is no guarantee that a high market share reflecting good past performance constitutes a reliable indicator of future advantages (Day and Wensley 1988).

Nowadays, the Travel and Tourism Competitiveness Index (TTCI) (World Economic Forum-WEF 2013) is considered an alternative measure of destination competitiveness to market share and other alternatives such as relative prices or gross domestic product (GDP) *per capita*. The TTCI aims to measure the factors and policies that make it attractive to develop the travel and tourism sector in different countries. A main disadvantage of this index is the limited period of time for which data are available. Fortunately, this measure is available for the timeframe of our research.

MEASURING EFFICIENCY IN THE HOTEL SECTOR

The terms “technical efficiency” and “productive efficiency” refer to the most appropriate manner of using inputs (resources) with the existing production technology. The hotel sector’s heterogeneity and the difficulty in determining the essential inputs and outputs of the production and the optimum quantity of resources required per unit of output. The solution lies in calculating the relative efficiency by estimating the behavior of a sample up to its statistical frontier, or the efficiency isoquant. Reviews of the literature on frontier models include Lovell (1993) and Coelli et al. (2005). In this paper global technical efficiency (GTE), pure technical efficiency (PTE), and scale efficiency (SE) computed through Data Envelopment Analysis (DEA) are used to measure the efficiency of the selected hotel chains.

Within the tourism sector, the restaurant industry was the first activity studied (Hruschka 1986; Banker and Morey 1986). These initial studies employed various productivity ratios to measure performance (Wijeysinghe 1993; Banker and Riley

1994). The use of parametric estimation in this technique creates a distinction between two types of frontier models: Data Envelopment Analysis model (Morey and Dittman 1995; Anderson et al. 2000; Brown and Ragsdale 2002; Barros and Dieke 2008; Assaf et al. 2010) and the Econometric Frontier model (Anderson et al. 1999; Barros 2004; Chen 2007; Hu et al. 2010).

The review of the existing literature (see Table 1) shows that at least 31 different inputs and 19 different outputs, consisting of measures of both physical and monetary or financial quantities, are used to represent the production process in the hotel sector (see Table 2). In this study three inputs (number of employees, salary cost, and number of rooms) and two outputs (total revenue and RevPar) are used to calculate efficiency.

Table 1 about here

Table 2 about here

According to the literature: a) the positive effects of belonging to a hotel chain or large business group (Tsaur 2001; Hwang and Chang 2003; Chen 2007; Assaf et al. 2010); b) the lack of a conclusive relationship with the size of the business despite being a source of significant economies of scale (Tsaur 2001; Barros 2005; Chen 2007); and c) the existence of ambiguous relationships with the various indicators of business results (Morey and Dittman 1995; Wöber 2000; Neves and Lorenzo 2009). The majority of the previously-mentioned research has exclusively studied technical efficiency, considerably limiting the conclusions obtained. The lack of information about the costs

of the different factors prevents a clear understanding of whether most of the losses in efficiency are assignative.

In economics, the term “technical” or “productive efficiency” is broadly used and has several different meanings. This study focuses on one of these meanings: technical efficiency as a performance indicator for the hotel business sector. The first formal definition of this process is found in Koopmans (1951). Technical efficiency exists when a unit, whether productive or not, achieves the maximum possible output (here limited by the number of available rooms) given the inputs with which it is endowed or instead uses less inputs than necessary. The work of Forsund and Hjalmarsson (1979) adds scale efficiency as a determining element of productive efficiency, incorporating the possibility that a particular increase in inputs leads to an increase in existing production by a greater proportion.

To evaluate the degree of technical efficiency of a specific production unit, it is necessary to use a two-stage process. In the first stage, we must determine a standard reference function that indicates, given a fixed production technology, the maximum output level achievable when starting from the different input combinations. The type of frontier to be considered depends on the type of efficiency under analysis. If the objective is to study technical efficiency, the frontier will then be a function of production. In contrast, if the objective is to analyze economic efficiency, the frontier will then be a function of costs, income, or benefits. Two methods have been traditionally proposed to estimate this frontier: methods that employ parametric

elements (Charnes et al. 1978) and methods that do not (Afriat 1972 and Aigner et al. 1977).

The non-parametric methodology that is most accepted in the literature is that proposed by Charnes et al. (1978)—the CRS model, which is the same thing as DEA. DEA is a method of measuring efficiency that employs (fractional) linear programming techniques (Table 3).

Table 3 about here

The purpose is to evaluate the relative efficiency. If the value of the prices or the weighting associated with the inputs and outputs is unknown, under an input orientation and assuming constant returns to scale, it is possible to obtain the level of technical efficiency. Banker et al. (1984)—who created the VRS model—expanded their previous analysis by considering variable returns to scale. This model mathematically differs from the previous model because it includes the variable, for which the sign is not restricted.

METHODOLOGY

In order to test the research question a two-stage methodology is used: a) Data Envelopment Analysis (DEA) of the selected hotel chains to determine efficiency; b) and mediation models with Baron and Kenny (1986) procedure and Solbel (1982) test to link destination competitiveness and hotel firms competitiveness through efficiency.

Mediation models were recognized in early psychology (Wodsworth 1928; Hyman 1955 and Lazarsfeld 1955) and were generalized to social sciences by Baron and Kenny (1986), who clarified the steps to assess mediation (MacKinnon et al. 2012). In a tourism research context, causal models and mediation effects have been recently used for many purposes. Relationship among destination image, tourist satisfaction and destination loyalty (Geng-Quing and Qu 2008), relations between tourism destination attractiveness and destination support services (Vengesayi 2010), relationships among value, satisfaction and behavioral intentions (Williams and Soutar 2009), relationships between perceived quality, visitor satisfaction and behavioral intentions (Žabkar et al. 2010), repurchase intentions for packaged tour services (He and Song 2009) are examples of mediation applications using survey structural equation modeling (SEM).

The most frequently used method described by Baron and Kenny (1986) suffers from low statistical power in most situations (MacKinnon et al. 2012). Fortunately, recently re-sampling methods aid to resolve the non-normality issues related with these tests improving the power of significance testing (Preacher and Hayes 2004).

As explained in the introduction and reflected in Figure 2, this article attempts to establish the relationship existing between the destination competitiveness (X), the efficiency of international hotel chains (M) and the competitiveness of these chains (Y). Thus, after exploring the existing correlations among the variables taken into account, indirect effects ($a \times b$) are estimated using the Baron and Kenny (1986) approach and the Sobel (1982) test. The MBESS package (Kelley and Lai 2012) for R programming language (R Core Team, 2013) is used for estimations. Due to sample size restrictions, bootstrap procedures are carried out to improve the accuracy of the results.

(Figure 2 about here)

Table 4 shows the data and sources used in this article. Data used to determine the efficiency and to represent destination and firm competitiveness it is shown.

(Table 4 around here)

Aware of the limitations already mentioned and considering the available data, in this paper we measure the international hotel chain competitiveness according to its market performance calculating world market share in terms of revenue. Travel and Tourism Competitiveness Index (World-Economic Forum-WEF, 2013) is considered a measure of destination competitiveness where hotel firms are based.

Our unit analysis consists of 15 hotel chains with a total of 29,453 hotels and 3,784,270 rooms. Seven of the hotel groups originate in Europe, the Middle East, and Africa (Rezidor Hotel Group, Accor Hotel Group, Meliá Hotels International, NH Hotels, IHG, and TUI Hotels & Resorts), seven are from the United States (Wyndham Hotels Worldwide, Hyatt Hotel Corporation, Choice Hotels International, Marriott Hotel International, Starwood Hotels and Resorts, and MGM Resorts), and three are from Asia (Home Inns, 7 Days Inn and Shangri La).

Of the top twenty hotels worldwide, we excluded three chains for one of two reasons: 1) Lack of reliable statistical data (Hilton Hotels and Jin Jiang Hotels); or 2) a business model that we could not consider to be a strict hotel chain (Best Western Hotels).

EFFICIENCY ANALYSIS DATA

The statistical data for the micro level analysis were derived from the annual reports of the studied hotel chains for the year 2010. Figure 3 reflect the size differences between the principal global hotel chains. The relationship between the number of hotels and their average size indicates the existence of a dual structure. With respect to the number of hotels, the Wyndham (6,074 hotels) and the Choice (7,114 hotels) hotel groups are noteworthy. As a result of the growth formula used, these groups have the least number of rooms per establishment, with 84 and 80 rooms, respectively.

Figure 3 about here

Although these hotels lead the worldwide hotel industry, variability associated with five determining aspects of the future structure of the sector it is found: a) average size (717 hotels on average per hotel chain, with 156,906 rooms and an average of 218 rooms per hotel); b) degree of internationalization (with an average presence in 22 countries); c) market positioning via multi-branding strategies (figure 4, with an average presence in two different segments of the market); d) RevPar (€53.63 on average) and the average annual occupancy rate (67.72%); and e) property structure (41.32% traditional investment vs. 58.68% administration/management contracts or franchising).

Figure 4 about here

It is precisely the development of more flexible expansion formulae (Figure 5), together with the differences in efficiency levels, the free entry and exit of companies, and

technological advances that will determine the future of this sector. The quest for greater levels of efficiency is therefore a determining element of the competitive capacity and thus the growth of the different corporate groups.

Figure 5 about here

The Data Envelopment Analysis (DEA) model requires data from both the inputs and outputs to be used as determining factors in the production process. Table 5 reflects the descriptive statistics of the variables used in our analysis. We define a production model characterized by three inputs (number of employees, salary cost, and number of rooms) and two outputs (total revenue and RevPar) to determine the boundaries of the efficiency envelope.

Table 5 about here

DESTINATION COMPETITIVENESS DATA

As Table 4 reflects, to determine destination competitiveness of the international hotel companies' country of origin, the TTCI index derived from the World Economic Forum report is used. These six countries are France (Accor), United States (Wyndham, Hyatt, Choice, Marriott, Starwood and MGM), Spain (Meliá and NH), China (7 days, Home Inns and Sangri- La), Germany (TUI) and United Kingdom (Intercontinental).

As shown in figure 6, all selected countries (except China) have similar levels of competitiveness and all of them belong to the top world competitiveness ranking.

Germany ranks second in a classification of 139 countries. France ranks third, United States sixth, United Kingdom seventh, Spain eighth. Only China is slightly different in thirty-ninth position, near of the upper quantile of the ranking. Although this clear association existing between macro competitiveness and micro competitiveness reinforces our hypothesis (destination competitiveness is crucial to business hotel success), the low variability of the sample (with mean 5.21 in a 1-to-7 scale and standard deviation of 0.37) represents a serious drawback for getting significant effects in econometric estimations.

Figure 6 about here

FIRM COMPETITIVENESS DATA

With regard to firm competitiveness, we use two measures. First, a classic indicator such as the global market share in terms of revenue. Second, trying to reflect a broader sense of firm competitiveness we build a composite indicator based on occupancy rates, the number of countries in which the chains have a presence, the revenue per room and the global revenue. This composite indicator is constructed as usual (normalizing the variables on a 0-to-1 scale with the formula $(V_i - V_{\min}) / (V_{\max} - V_{\min})$) and aggregating them in an un-weighted sum on a scale ranging from 0 to 4.

Figure 7 shows the market performance in terms of revenue market share. We can see that Marriot, Accor, MGM and Starwood are the most successful chains, representing 65.40 within sample share. These high revenues are associated with the large size of these chains.

Figure 7 about here.

Figure 8 shows the market performance of each chain in terms of the composite indicator. With this broader conception of business success we can observe that Marriott continues at the top of the ranking, but now Starwood outperforms Accor and MGM. These changes seem to be associated with the customer orientation of the chain.

To achieve consistency with the efficiency indicators calculated, in the results section we will rescale the destination competitiveness and firm competitiveness indicators with a 1-to-100 scale using direct proportionality with the formula $V_i \cdot 100 / V_{\max}$.

Figure 8 about here

EMPIRICAL ANALYSIS. RESULTS

DATA ENVELOPMENT ANALYSIS

We used the Data Envelopment Analysis (DEA) technique, the CRS model (Charnes et al. 1978), and the VRS model (Banker et al. 1984) to calculate the GTE, PTE, and SE levels of the principal international hotels. Table 6 and Figure 9 summarize the indices so obtained.

Figure 9 about here

On average, the GTE is 78.06%. According to the work of Anderson, Fok, and Scott (2000) this level is acceptable and a clear indicator that the hotel sector is a highly competitive industry. Following the work of Farrell (1957) and using an input approach, we can observe from this result that it is possible to obtain an identical output by

reducing all of the inputs used by 21.94%. The two chains in which the lowest levels of GTE are observed are TUI Hotels & Resorts (GTE = 26.55%) and 7 Days Inn (GTE = 40.39%). Compared with the results of other studies (Andersson et al. 2000; Wang et al. 2006; Assaf et al. 2010), these results help to better understand the competitive capacity of chains as different as the Rezidor Hotel Group, IHG, Choice Hotels, Marriott Hotels, MGM Resorts, Home Inns, and Shangri La.

The scaled efficiency levels achieved, on average (SE = 91.13%) approach the size that Coelli et al. (2005) consider to be an efficient production scale (TOPS). The PTE indices demonstrate the pure technical nature of the levels of efficiency achieved. Here, we include aspects connected to management practices (management and board quality), the best use of the resources employed in the production process, better organisation of human and material resources, better employee qualifications, and better adaptation of person-position or the design of adequate commercial policies, amongst others.

Table 6 about here

It is interesting to relate these results to a group of variables that can help us to characterize and segment the industry as a whole. First, we confirmed the existence of a high level of variability in average size. Whereas there are 3,218 rooms per hotel in the MGM Resorts group, there are 84 rooms in Choice Hotels on average. The highest levels of GTE are found in the average size interval (between 121–240 rooms) at a rate of 91.27% (PTE = 95.44%, ES = 95.35%). Meliá Hotels International (223

rooms/hotel), Marriott Hotels (161 rooms/hotel), IHG (146 rooms/hotel), Rezidor Hotel Group (213 rooms/hotel), and NH Hotels (148 rooms/hotel) belong to this group. It would therefore seem that a dual structure in the group of large hotel chains exists rather than an optimum size structure, as indicated before. As Shy (1995) indicates, each market is to some degree structurally unique.

Additionally, except for the Days Inn, Home Inns, and MGM Resorts hotels, there is a high level of internationalization in the sample studied. One of the groups stands out from the others in this regard given its presence in more than 60 countries. Starwood Hotels (100 countries), Accor (90 countries), Marriott Hotels (70 countries), Wyndham Hotels (65 countries), IHG (60 countries), and Rezidor Hotel Group (62 countries). The GTE indexes obtained for this group ($GTE = 81.16\%$) are higher than those estimated for the groups with a low international presence ($GTE = 74.36\%$). This international growth, as illustrated in Figure 4, has been supported by much more flexible expansion formulas (involving management and franchise contracts) and on investments that require a greater level of financial risk. Except in the TUI Hotels & Resorts group, we found a greater level of GTE in those chains with strategies emphasizing the exploitation of assets ($GTE = 83.77\%$ vs. $GTE = 79.12\%$) and in those that are located in two large geographic areas: America and the Caribbean ($GTE = 84.72\%$) and Asia-Pacific ($GTE = 80.13\%$). The inefficiency in this group is essentially due to greater difficulty implementing integrated management systems throughout the chain as a whole ($PTE = 85.58\%$; $ES = 98.02\%$) as a result of the group's lesser financial impact.

Finally, there is a positive correlation between the level of specialization of the brand in a specific segment of the market and the GTE levels. Therefore, multi-branding positioning (GTE = 75.54%) may be associated with better results (GTE = 88.10%) in those corporate groups that have had more success in a specific segment of the market (luxury, upscale, midscale, or budget/economy). The example used here is that of the Shangri-La chain (100% Luxury), 7 Days Inn (100% Budget/Economy), Starwood Hotels & Resort (100% Upscale and Luxury), or NH Hotels (100% midscale and upscale) compared with groups such as Accor (6.43% luxury, 4.26% upscale, 30.79% midscale, and 58.52% budget/economy), TUI Hotels & Resorts (74.05% upscale, 16.41% midscale, and 9.54% budget/economy), or Meliá Hotels International (8.53% luxury, 32.42% upscale, and 54.61% midscale).

MEDIATION MODEL

The exploratory analysis shows that the proposed variables do not fit a normal distribution. This is a problem because normality is required for correlation analysis. Normality is strongly violated in the tourism destination competitiveness index (TTCI) and in all sub-indices (regulatory, business and human) of these measures, where China appears as an outlier. With respect to efficiency measures, normality is violated in the scale efficiency (ES) index. Global (GTE) and pure technical efficiency (PTE) exhibit a more normal distribution but are negatively skewed. Finally, the most normal distribution is observed in market performance measures, especially in the composite indicator (CI), as market shares (MS) is positively skewed. As explained above, most of these problems are derived for the small sample size (only 15 observations) and the low

variability of some indicators (six observations corresponding to the same country, United States). To reduce the non-normality issues and to obtain robust estimations, bootstrap procedures are carried out.

A sample correlations matrix (not-bootstrapped) shows a significant relationship between variables measuring the same construct (i.e. within group). Thus, all spatial competitiveness measures are self-correlated, and the same occurs between market performance and efficiency measures. Only the PTE-ES pair has a low correlation. However, none of the correlations between groups are significant. Specifically, there is a positive relationship between the spatial competitiveness and the chains' market performance (0.39 with MS and 0.31 with the CI) and a negative relationship between the spatial competitiveness and the efficiency measures (-0.14 with GTE, 0.10 with PTE and -0.35 with the ES). Meanwhile, a strange association between efficiency and market share exists: GTE and PTE show positive correlations with MS and negative correlations with the CI but ES shows the reverse pattern; a positive relationship with the CI and a negative one with market share. As previously explained, none of the explained correlations are significant (the lowest p-value is 0.15 for the pair TTCI-MS), but none of these correlations are reliable given that normality is strongly violated by most variables.

Table 7 shows bootstrap confident intervals for correlations based on 999 replications at a 95% level. We can see that the only significant correlation is the positive one existing between spatial competitiveness and market performance measured as market share (TTCI-MS). All other calculated correlations are not significant, given that zero always

belongs to intervals. The bootstrap distributions seem fairly normal for the pairs TTCI-CI and TTCI-MS but normality is again violated for the pairs TTCI-PTE and TTCI-GTE which seem to exhibit a bimodal distribution.

Table 7 about here

In summary, this preliminary analysis of the available data confirms a positive association between destination competitiveness and hotel competitiveness when market shares are used. Thus, in terms of mediation analysis, a direct effect exists. However, no significant relationship between competitiveness (neither on a territorial or a firm level) and efficiency is appreciated.

According to our methodology, the next step would be to calculate the indirect effects and to test for mediation when efficiency measures are included in the relation between destination competitiveness and hotel market performance. However, we should be skeptical about obtaining a positive result, given the lack of a relationship between competitiveness and efficiency and between efficiency and market performance (the indirect effect). In any case, the existence of a direct relationship between territorial competitiveness and market performance encourages us to explore for mediation.

Table 8 shows Sobel's tests and the bootstrap indirect effects for different proposed models. As anticipated, with the available data, no mediation relationships are observed among the variables. Sobel's test statistics (z) is always lower than its critical value of

1.96, and zero always corresponds to bootstrap intervals. Therefore, for this sample, efficiency measures based on DEA are more like covariates than mediators.

Table 8 about here

CONCLUSIONS

The competitiveness of the economy plays a key role in the international success of firms located within it. This study seeks to confirm this relationship for a selection of fifteen international hotel firms and their countries of origin. An innovative feature is the incorporation of technical-economic efficiency as a mediator variable in the causal link.

The link between destination competitiveness (measured by the TTCI) and the success of the hotel chains (measured in terms of their market share or a synthetic indicator created for this purpose) is directly confirmed by verifying that the principal international chains are based in countries which are at the top of the tourism competitiveness ranking, in accordance with the theory. However, this fact generates very little variability in the sample, which, together with its small size prevents us from obtaining significant effects in the econometric estimates.

Specifically, the empirical analysis confirms a significant positive correlation between the TTCI and the revenues market share, which constitutes the direct effect of the mediation analysis. This can be principally explained by the presence of China and its

hotels in the sample. However, when technical-economic efficiency measures calculated through data envelopment analysis (DEA) are incorporated, no mediating effect of this variable can be observed. Therefore, with the available data, we can say that efficiency acts more as a covariate than a mediator.

We evaluated GTE as an efficiency indicator for the principal international hotel chains. The analysis of this indicator demonstrates the difficulty of understanding the structure of this sector in aggregate terms. The heterogeneity of both the sector as a whole and the various businesses within the sector demonstrates the need to consider an industrial economic perspective when studying the hotel sector. Additionally, we identified three factors with positive correlations with GTE levels: a) a greater degree of internationalization; b) growth based principally on light assets, centered on two large geographic areas, i.e., America (the United States) and Asia Pacific; and c) a greater level of specialization due to multi-branding strategies.

The result obtained in the empirical section is conditioned by the existing data which represent the main limitation of the analysis carried out. An increase in the size of the sample and its variability could be expected by incorporating hotel chains from other countries, either consolidated or emerging as a result of the strong process of globalization experienced by the hotel industry in recent years. To continue with this line of research, we suggest to study whether the presence of foreign direct investment in the hotel industry gives rise to an increase in the competitiveness of the destination of the investment, due to knowledge transfer. Accordingly, efficiency may explain the reverse direction of causality.

Nevertheless, our analysis enables us to confirm that the mechanism traditionally established by the economic literature whereby territorial competitiveness is transferred to firm competitiveness through efficiency is not so direct, at least in the analysed sample. This could be due to the specific characteristics of the hotel industry where other variables other than efficiency could contribute to explaining this link (fashion, location, cultural values, etc.).

However, the principal innovative feature incorporated into this study is the integrated approach to the phenomenon of competitiveness, analysing competitiveness at micro and macro level. It represents the first approach to a methodology which has yet to be empirically confirmed in the field of economic theory and tourism economy.

REFERENCES

- Afriat, S.N. (1972). Efficiency estimation of production functions. *International Economic Review* 13 (3), 568-598.
- Aigner, D.J., Lovell, C.A.K., and Schmidt, P. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Econometrics* 6 (1), 21-37.
- Anderson, R.I., Fish, M., Xia, Y., and Michello, F. (1999). Measuring efficiency in the hotel industry: A stochastic frontier approach. *Hospitality Management* 18 (1), 45-57.

Anderson, R.I., Fok, R., and Scott, J. (2000). Hotel industry efficiency: An advanced linear programming examination. *American Business Review* 18 (1), 40-48.

Assaf, A.G., Barros, C.P., and Josiassen, A. (2010). Hotel efficiency: A bootstrapped metafrontier approach. *International Journal of Hospitality Management* 29 (3), 468-475.

Bain, J.S. (1959). *Industrial Organisation*. New York: Wiley.

Banker, R.D., Charnes, A., and Cooper, W.W. (1984). Some models for estimating technical and scale inefficiencies in Data Envelopment Analysis. *Management Science* 30 (9), 1078-1092.

Banker, R.D., and Morey, R.C. (1986). Efficiency analysis for exogenously fixed inputs and outputs. *Operations Research* 34 (4), 513-521.

Banker, M., and Riley, M. (1994). New perspectives on productivity in hotels: some advances and new directions. *International Journal of Hospitality Management*, 13(4), 297-311.

Baron R.M and Kenny, D.A (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51: 1173-1182.

Barros, C.P. (2004). A Stochastic Cost Frontier in the Portuguese Hotel Industry. *Tourism Economics* 10 (2), 177-192.

Barros, C.P. (2005). Measuring efficiency in the hotel sector. *Annals of Tourism Research* 32 (2), 456-477.

Barros, C. P. (2005) Evaluating the efficiency of a small hotel chain with a Malmquist productivity index. *International Journal of Tourism Research*, 7:173-184.

Barros, C.P., and Dieke, P. (2008). Technical efficiency of African hotels. *International Journal of Hospitality Management* 27 (3), 438-447.

Barros, C.P, Botti, L., Peypoch, N., Robinot, E., Solonandrasana, B. and Assaf, A.G (2011). Performance of French destinations: Tourism attraction perspectives. *Tourism Management*, 32:141-146.

Barros, C.P. and Santos, C. (2006). The measurement of efficiency in Portuguese hotel using Data Envelopment Analysis. *Journal of Hospitality and Tourism Research*, 30(3):378-400.

Bossetti, V., Cassinelli, M., and Lanza, A. (2006). Benchmarking in tourism destination, keeping in mind the sustainable paradigm. *Nota di Lavoro*, Fondazione Eni Enrico Mattei.

Brown, J.R., and Ragsdale, C.T. (2002). The competitive market efficiency of hotel brands: an application of data envelopment analysis. *Journal of Hospitality and Tourism Research* 26 (4), 332-360.

Buhalis, D. (2000). Tourism in an Era of Information Technology. In B. Faulkner, G. Moscardo and E. Laws (Eds.), *Tourism in the 21st Century: Lessons from Experience* (pp.7-32). London: Continuum.

CEPAL (1999). *La Competitividad Sistémica*. Revista CEPAL N° 59: 39-52.

Charnes, A., Cooper, W.W., and Rhodes, E.L. (1978). Measuring the efficiency of decision making unit. *European Journal of Operational Research* 2 (6), 429-444.

Chen, C.F. (2007). Applying the stochastic frontier approach to measure hotel managerial efficiency in Taiwan. *Tourism Management* 28 (3), 696-702.

Chesnai, F. (1981) *The notion of International Competitiveness*. Mimeo. OECD. París.

Chudnovsky, D. and Porta, F. (1990) *La Competitividad Internacional Principales Cuestiones Conceptuales y Metodológicas*. CEIPOS Universidad República de Uruguay.

Coelli, T.J., Rao, P.D.S., O'Donnell, C.J., and Battese, G.E. (2005). *An Introduction to Efficiency and Productivity Analysis*. New York: Springer, Second Edition.

Contractor, F.J., and Kundu, S.K. (1998). Franchising versus company-run operations: modal choice in the global hotel sector. *Journal of International Marketing* 6 (2), 28-53.

Cowling, K. (1976). On the theoretical specification of structure-performance relations. *European Economic Review* 8 (1),1-14.

Cracolici, M., Nijkamp, P. and Rietveld, P. (2006). Assessment of Tourist Competitiveness by Analysing Destination Efficiency. Tinbergen Institute Discussion Paper TI 2006-097/2.

Craigwell, R. (2007). Tourism competitiveness in small island developing states. *United Nations University – World Institute for Development Economics Research. Research Paper N° 2007/19*

Croes, R. (2011). Measuring and Explaining Competitiveness in the Context of Small Island Destinations. *Journal of Travel Research*, 50(4):431-442

Crouch, G. (2006). Destination competitiveness: insight attribute importance. International Conference of trends, impacts and policies on tourism development. Crete, June 15-18.

Crouch, G.I. and Ritchie, J.R. (1999). Tourism, Competitiveness, and Social Prosperity. *Journal of Business Research*, 44:137-152

Crouch, G.I. (2011). Destination competitiveness: an analysis of determinant attributes. *Journal of Travel Research*, 50 (1), 27:45

D'Hauteserre, A.M. (2000). Lesson in managed destination competitiveness: the case of Foxwoods Casino Resort. *Tourism Management*, 21:23-32

Day, G.S, Wensly, R. (1988). Assessing Advantage: A Framework For Diagnosing Competitive Superiority. *Journal of Marketing* (52): 1-20

D'Cruz, J., and Rugman, A. (1992) New Concepts for Canadian Competitiveness. Kodak, Canada.

Delgado, M., C.C. Ketels,, M.E. Porter and S. Stern (2012): The Determinants of National Competitiveness, NBER Working Paper Series No. 18249.

Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Law and Economics* 16 (1), 1-9.

Dwyer, L. and Kim, C. (2003). Destination competitiveness: determinants and indicators *Current Issues in Tourism*, 6 (5), 369-414.

ECORYS (2011), Study on the Competitiveness of the European Companies and Resource Efficiency. Final Report.

Eyster, J. (1993). The revolution in domestic management contracts. *Cornell Hotel and Restaurant Administration Quarterly* 34 (1), 16-26.

Farell, M.J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistics Society Series A* 120 (3), 253-290.

Førsund, F.R., and Hjalmarsson, L. (1979). Generalised Farrell measures of efficiencies: An application to milk processing in Swedish dairy plants. *Economic Journal* 89, 294-315.

Geng-Quing, C. and Qu, H. (2008) Examining the structural relationships of destination image, tourist satisfaction and destination loyalty: An integrated approach. *Tourism Management*, 29: 624-636.

New Economic Foundation (2013): Happy Planet Index 2012 Report: a global index of sustainable well-being: <http://www.happyplanetindex.org/assets/happy-planet-index-report.pdf> [Accessed February 23, 2016]

Hassan, S.S. (2000). Determinants of market competitiveness in an environmentally sustainable tourism industry. *Journal of Travel Research*, 38: 239-245

He, Y. and Song, H (2009) A Mediation Model of Tourists' Repurchase Intentions for Packaged Tour Services. *Journal of Travel Research*, 47 (3):317-331.

Heath, E. (2003). Towards a model to enhance destination competitiveness: A Southern African perspective. *Journal of Hospitality and Tourism Management*, 10(2): 124-141.

Homburg, C., Koschate, N., and Hoyer, W.D. (2005). Do Satisfied Customers Really Pay More? A Study of the Relationship between Customer Satisfaction and Willingness to Pay. *Journal of Marketing* 69, 84-96.

Hruschka, H. (1986). Ansätze der Effizienzmessung von Betrieben. *Journal für Betriebswirtschaft* 36 (2), 76-85.

Hu, J.L., Chiu, C.N., Shieh, H.S., and Huang, C.H. (2010). A stochastic cost efficiency analysis of international tourist hotels in Taiwan. *International Journal of Hospitality Management* 29 (1), 99-107.

Hwang, S.N., and Chang, T.Y. (2003). Using data envelopment analysis to measure hotel managerial efficiency change in Taiwan. *Tourism Management* 24 (4), 357-369.

Hyman, H.H. (1955). *Survey design and analysis: Principles, cases, and procedures*. Glencoe, IL: Free Press.

Johns, N., Howcroft, B. and Drake, L. (1997). The use of data envelopment analysis to monitor hotel productivity. *Progress in Tourism and Hospitality Research*, 3: 1997-127.

Kelley, K. and Lai, K (2012) MBESS: Methods for the Behavioral, Educational and Social Sciences. An R package, version 3.3.3. URL: <http://CRAN.R-project.org/package=MBESS>.

Knezevic-Cvelbar, L., Dwyer, L., Koman, K. Mihalic, T. (2016): Drivers of destination competitiveness in tourism: a global investigation, in *Journal of Travel Research*, pp. 1-10. DOI: 10.1177/0047287515617299

Koopmans, T.C. (1951). Efficient allocation of resources. *Journal of the Econometric Society* 19 (4), 368-403.

Lall, S. (2001) *Competitiveness, Technologies and Skills*. Edward Elgar Publishing. Cheltenham, U.K

Lazarsfeld, P.F. (1955) Interpretation of statistical relations as a research operation. In P.F. Lazarsfeld and M. Rosenberg (Eds.), *The language of social research: A reader in the methodology of social research* (pp. 115-125). Glencoe, IL: Free Press.

Lovell, C.A.K. (1993). Production Frontiers and Productive efficiency. In Fried, H.O., Lovell, C.A.K. and Schmidt, S.S. (Eds.), *The measurement of productive efficiency: Techniques and applications*. New York: Oxford University Press.

MacKinnon, D.P., Lockwood, J.M., Hoffman, J.M, West, S.G., Sheets, V. (2002) A comparison of methods to test mediation and other intervening variable effects. *Psychol Methods*, 7 (1):83-104

MacKinnon, D., Cheong, J., and Pirlott, G. (2012). Statistical Mediation Analysis. In Cooper H. (Editor-in-chief) *APA Handbook of Research Method in Psychology*. Vol 2 Research Designs. (pp.313-331). American Psychological Association.

Manasakis, C., Apostolakis, A. and Datseris, G. (2013). Using data envelopment analysis to measure hotel efficiency in Crete, *International Journal of Contemporary Hospitality Management*, 25 (4): 510 - 535.

Marco, B., García, F., Sabater, V. and Úbeda, M. (2014) Territory impact on the performance of Spanish vacation hotels, *Tourism Economics*, 20 (4), 779–796 doi: 10.5367/te.2013.0301

Mason, E.S. (1939). Price and production policies of large-scale enterprises. *American Economic Review* 29, 61-74.

Mathis, J., Mazier, J., Rivaud-Danset D. (1988) *La Compétitivité industrielle*. IRES, Dunod, Paris.

Michalet. C.A. (1981) *Competitiveness and Internationalisation*. Mimemo. OECD. Paris.

Morey, R.C., and Dittman, D.A. (1995). Evaluating a hotel GM's performance: A case study in benchmarking. *Cornell Hotel Restaurant and Administration Quarterly* 36 (5), 30-35.

Neves, J.C., and Lourenco, S. (2009). Using data envelopment analysis to select strategies that improve the performance of hotel companies. *International Journal of Contemporary Hospitality Management* 21 (6), 698-712.

OECD (1992) *Technology and the Economy. The Key Relationship*. París.

Omerzel, D., Mihalic, T. (2008). Destination competitiveness – Applying different models, the case of Slovenia. *Tourism Management*, 29:294-307.

Perles-Ribes J.F., Ramón-Rodríguez A.B., Rubia-Serrano, A., and Moreno-Izquierdo, L. (2013). Economic Crisis and Tourism Competitiveness in Spain: permanent effects or transitory shocks. *Current Issues in Tourism*. DOI 10/1080/13683500.2013.849666

Poon, A. (1993). *Tourism, technology, and competitive strategy*. Walingford: CAB International.

Porter M (1990) *The Competitive Advantage of Nations*. The Free Press. New York.

Porter, M.E., Delgado, M., Ketels, C. and Stern, S. (2008): Moving to a new global competitiveness Index, in the Global Competitiveness Report 2008-2009, edited by M.E.Porter and K. Schwab, 43-64. Geneva: World Economic Forum.

Preacher, K.J and Hayes, A.F. (2004) SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36: 717-731.

R Core Team (2013). R: A language and Environment for Statistical Computing. R Foundation for Statistical Computing. Vienna. Austria. URL: <http://www.R-project.org>.

Sanjeev, G.M. (2007). Measuring efficiency of the hotel and restaurant sector: the case of India. *International Journal of Contemporary Hospitality Management* 19 (5), 378-387.

Scott, B and Lodge, G. (1985) US Competitiveness in the World Economy. Harvard University Press.

Shy, O. (1995), *Industrial Organization: Theory and Applications*, MIT Press, Cambridge, MA.

Spence, A. and Hazard, H. (1998) *International Competitiveness*. Cambridge M.A. Ballinger Publishing Company.

Sobel, M.E (1982) Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, 13: 290-312.

Tsaur, S.H. (2001). The operating efficiency of international tourist hotels in Taiwan. *Asia Pacific Journal of Tourism Research* 6 (1), 73-87.

Vengesai, S. (2010) Tourism Destination Attractiveness: The Mediating Effect of Destination Support Services. *The Business Review*, Cambridge, 16 (2): 179-185.

Viner, J. (1952). Cost curves and supply curves. In Stigler, C.J. and Boulding, K.E. (Eds.) *Readings in price theory*. Richard D. Irwin, Inc.: Chicago.

Wang F., Hung, W. and Shang, J. (2006) Measuring the cost efficiency of international tourist hotels in Taiwan, *Tourism Economics*, 12(1), 65-85.

Wijeysinghe, B.S. (1993). Breakeven occupancy for a hotel operation. *Management Accounting* 71 (2), 32-33.

Williams, P., and Soutar, G.N. (2009) Value, satisfaction and behavioral intentions in an adventure tourism context. *Annals of Tourism Research*, 36 (3): 413-438.

Williamson, O. (1985). *The economic institutions of capitalism*. New York: The Free Press.

Wöber, K.W. (2000). Benchmarking Hotel Operations on the Internet: A Data Envelopment Analysis Approach. *Journal of Information Technology and Tourism* 3 (3-4), 195-211.

Woodworth, R.S (1928). Dynamic psychology. In C. Murchison (Ed.) *Psychologies of 1925* (pp:111-126). Worcester, M.A: Clark University Press.

World Economic Forum (2011). *The Travel and Tourism Competitiveness Report. Beyond the Downturn*. WEF. Geneva. Switzerland.

World Economic Forum (2013) *The Travel and Tourism Competitiveness Report. Reducing Barriers to Economic Growth and Job Creation*. WEF. Geneva.

Žabkar, V., Brenčić, M.M and Dmitrović, T. (2010) Modelling perceived quality, visitor satisfaction and behavioural intentions at the destination level. *Tourism Management*,

31 (4): 537-546.

Zhang, L., Botti, L., and Petit, S (2016). Destination performance: Introducing the utility function in the mean-variance space. *Tourism Management*, 52:123-132.

Table 1. Main contributions from the literature review

Study	Sample	Method	Inputs	Outputs	Results	Conclusions
Morey and Dittman (1995)	54 hotels belonging to the same US hotel chain in 1993	DEA model with input orientation Presumably assumes constant return to scale (CRS). CRS model	Number of rooms Number of employees Occupancy Rate Average daily rate Expenses Reservation Dept. Salary costs Non-salary costs Energy costs Publicity costs Administration costs	Total income Satisfaction index Market share Growth index	ETM = 0.89	1) There is no direct relationship between results and efficiency. Very profitable establishments exist that are highly inefficient 2) If a hotel is efficient, its low profitability is due to external factors
Anderson, Fok and Scott (2000)	48 US hotels and motels in 1994	DEA model with input orientation Assumes different types of returns: constant returns (CRS model) and variable returns (VRS model).	Number of full-time employees Number of rooms Total cost of casino dept. Total cost of food and beverage dept. Other expenses	Total income Other income Labour price: total income / number of employees Room price: total income / (number of rooms × occupancy rate × number of days the hotel is open) Remainder of prices: derived as % of income	ETM = 0.4244	1) Finds a higher level of inefficiency than do other studies; explains this as due to the fact that we are in a non-competitive market 2) Most of the loss in efficiency produced is assigned
Study	Sample	Method	Inputs	Outputs	Results	Conclusions
Tsaur (2001)	53 hotels in Taiwan in 1996–1998.	DEA model with input orientation Presumably assumes constant returns to scale (CRS) CRS model Proposes a	Total cost Number of employees Number of rooms Surface area of food and beverage dept. Number of employees, reservations	Total income Number of occupied rooms Average daily rate Average income per	ETM = 0.8733	1) The hotels in hotel chains are more efficient than independent hotels 2) Hotels with individual customers are more efficient than those with group customers 3) Sources of

		triple model for measuring measure global efficiency based on the reservations department and the food and beverage department	dept. Number of employees, food and beverage dept. Total cost of food and beverage dept.	employee Income of food and beverage dept. Income of reservations dept.		inefficiency: large size and too much space dedicated to the food and beverage departments
Sanjeev (2007)	68 hotels and restaurants in India in 2004–2005	DEA model with input orientation that assumes constant returns to scale (CRS model)	Fixed assets Total assets Operational Costs Own resources + long-term debts	Total income Benefits before and after taxes and depreciation	ETM = 0.7650	1) Existence of a positive correlation between efficiency and size 2) Very competitive industry; low level of dispersion of results obtained in efficiency analysis 3) The most efficient hotels were either the largest or the smallest in the sample
Barros and Dieke (2008)	12 hotels in Luanda in 2000–2006	DEA model with input orientation Assumes different types of returns: constant returns to scale (CRS model) and variable returns (VRS model)	Total cost Investment expense	RevPar	ETM = 0.876	1) Belonging to a hotel chain contributes to greater efficiency 2) Greater market share is associated with higher efficiency achieved by the hotel.
Study	Sample	Method	Inputs	Outputs	Results	Conclusions
Assaf, Barros and Josiassen (2010)	78 hotels in Taiwan in 2004–2008	DEA model with meta-frontier application	Number of rooms Total number of employees, reservations dept. Total number	Total income from rooms Total income from restaurant Total income of remaining depts.	ETM = 0.75	1) The hotels managed by hotel chains are more efficient than independently managed hotels 2) Size has a positive incidence on the efficiency

			of employees, restaurant dept. Total number of employees in remaining departments	Occupancy rate Number of customers per employee		levels achieved
Hu, Chiu, Shieh and Huang (2010)	66 hotels in Taiwan in 1997–2006	Translog costs function	Price of labour Price of food and beverages Price remainder of operations	Income from rooms Income from food and beverages Income from other operations Environment variables Distance to international airports. Belonging to a hotel chain Location: urban vs. peripheral Number of guides in which the hotel is featured.	ETM = 0.91	1) The hotels managed by hotel chains are more efficient than independently managed hotels 2) Location is not a significant variable

Source: Authors own elaboration

Table 2. Inputs and outputs employed in main efficiency studies.

INPUTS	OUTPUTS
<ul style="list-style-type: none"> • Number of rooms • Hotel surface area • Surface area of food and beverage department • Surface area of the casino • Number of beds • Total assets • Fixed assets • Owned resources plus long-term debt • Occupancy rate • ADR • Customer ranking • Loyalty • Demand variability • Proportion of internet reservations • Total cost • Cost of the reservations department • Cost of the food and beverage department • Cost of the administration department • Cost of the casino department • Cost of the marketing department • Cost of the management department • Cost of the cleaning department • Cost of the Information and Communication Technologies department • Cost of supplies • Number of days open • Total labour hours • Number of employees • Number of employees per department • Number of management employees • Investment expenses • External expenses 	<ul style="list-style-type: none"> • Total income • Total income of the reservations department • Income of the food and beverage department • Other income • Number of overnight stays • Yield index • Average Daily Rate (ADR) • Average income per employee • Installations index • Satisfaction index • Market share • Sales growth rate • Total meals served • Total drinks sold • Annual occupancy rate • EBITDA • RevPar • Duration of stay

Source: Authors own elaboration

Table 3. Advantages and drawbacks of DEA and FSA.

Data Envelopment Analysis (DEA)	Frontier Stochastic Analysis (FSA)
<p><u>Advantages:</u></p> <p>DEA is a non-parametric technique that does not require a hypothetical functional relationship between inputs and outputs.</p> <p>Inputs and outputs may represent different physical or monetary units without an <i>a priori</i> relationship between the two.</p> <p><u>Disadvantages:</u></p> <p>In general, DEA ignores prices and does not consider the stochastic nature of the production process.</p> <p>DEA is deterministic, attributing the entire deviation of the analysed unit beyond the reference frontier to technical inefficiency.</p>	<p><u>Advantages:</u></p> <p>If the frontier is correctly defined, FSA provides more certainty that what is identified as a frontier actually is a frontier.</p> <p>FSA separates technical inefficiency from exogenous shocks.</p> <p><u>Disadvantages:</u></p> <p>FSA requires specification of the production technology, which is usually unknown <i>a priori</i> (Cobb-Douglas, Translog, or CES).</p> <p>FSA requires initial assumptions to be made regarding the statistical distribution of the error term.</p>

Source: Authors own elaboration

Table 4: Variables used in our analysis relating destination, firm competitiveness and efficiency.

Variable	Measure	Value	Source
Destination Competitiveness	Tourism and Travel Competitiveness Index (TTCI)	Original scale 0-7, rescaled in a 0-100	World Economic Forum (2011)
Efficiency Inputs	Number of employees (workers) Salary Cost (salary) Number of rooms (rooms)	DEA efficiency indexes measured in a 0-100 scale	Annual Reports of Hotel Chains in 2010
Efficiency Outputs	Total Revenue (revenue) Revenue per room (revpar)		Annual Reports of Hotel Chains in 2010
Firm Competitiveness	Total Revenue Market share	0-100	Annual Reports of Studies Hotel Chains in 2010
	Composited Indicator (ci) based on occupancy rates, number of operating countries, revenue per room and total revenue	Original scale 0-4 rescaled in 0-100	

Source: Authors own elaboration

Table 5. Descriptive statistics for the variables employed in the DEA model (year 2010).

Variable	Factor	Mean	Max	Min	S.D.
Total Revenue	OUTPUT	M€1,388.60	M€9,038	M€16	2,522.17
RevPar	OUTPUT	€3.63	€10	€7	30,44
No. of employees	INPUT	24,564.02	145,000	1,524	50,776.34
Salary cost	INPUT	M€437.12	M€1,703	M€18	516.91
No. of rooms	INPUT	156,906.24	647,161	25,419	228,707.12

Source: Authors own elaboration

Table 6. Estimated efficiency indices, CRS model (DEA).

CRS-VRS Model - INPUT Orientation			
	GTE	PTE	ES
Rezidor Hotel Group (RZ)	100.00%	100.00%	100.00%
Accor Hotel Group (AC)	55.14%	97.89%	56.33%
Home Inns (HI)	100.00%	100.00%	100.00%
Meliá Hotels International (ME)	77.11%	91.59%	84.19%
7 Days Inn (7D)	40.39%	42.21%	95.69%
NH Hotels (NH)	79.24%	85.63%	92.54%
Wyndham Hotels (WY)	70.02%	70.02%	100.00%
Hyatt Hotels (HY)	71.49%	71.49%	100.00%
IHG (IH)	100.00%	100.00%	100.00%
Shangri La (SL)	100.00%	100.00%	100.00%
Choice Hotels (CH)	100.00%	100.00%	100.00%
Marriott Hotels (MA)	100.00%	100.00%	100.00%
Starwood Hotels & Resorts (SW)	51.55%	51.55%	100.00%
TUI Hotels & Resorts (TU)	26.55%	70.33%	37.75%
MGM Resorts (MG)	100.00%	100.00%	100.00%
Average	78.06%	85.40%	91.13%
Highest efficiency	100.00%	100.00%	100.00%
Lowest efficiency	26.55%	51.55%	37.75%
Standard deviation	0.2504	0.1956	0.1874

Source: Authors own elaboration

Table 7. Bootstrap confidence intervals based on 999 replications

Correlation	Normal	Percentile	BCa
TTCI-GTE	(-0.79 , 0.54)	(-0.74 , 0.54)	(-0.61 , 0.70)
TTCI-PTE	(-0.54 , 0.81)	(-0.51 , 0.70)	(-0.44 , 0.78)
TTCI-ES	(-0.75 , 0.04)	(-0.95 , 0.11)	(-0.95 , 0.05)
TTCI – MS	(0.08 , 0.68)	(0.06 , 0.65)	(0.03 , 0.64)
TTCI – CI	(-0.05 , 0.68)	(-0.11 , 0.66)	(-0.11 , 0.66)
GTE-MS	(-0.44 , 0.65)	(-0.62 , 0.45)	(-0.56 , 0.47)
GTE-CI	(-0.57 , 0.48)	(-0.57 , 0.45)	(-0.59 , 0.44)
PTE-MS	(-0.36 , 0.67)	(-0.49 , 0.52)	(-0.50 , 0.51)
PTE-CI	(-0.70 , 0.56)	(-0.66 , 0.53)	(-0.67 , 0.51)
ES-MS	(-0.58 , 0.55)	(-0.66 , 0.39)	(-0.78 , 0.34)
ES-CI	(-0.38 , 0.47)	(-0.33 , 0.51)	(-0.45 , 0.42)

Source: Authors own elaboration. Original sample N=15. Level=95%

Table 8. Mediation models and estimated indirect effects

Causal relationship	Indirect effect and Sobel's (z) test (N=15)	Bootstrap Bca confidence intervals for indirect effect
TTI→GTE→MS	Indirect: -0.02 z=-0.33	(-2.36 , 0.19)
TTI→GTE→CI	Indirect: 0.00 z=0.00	(-3.06 , 1.14)
TTI→PTE→MS	Indirect: 0.01 z= 0.27	(-0.23, 1.04)
TTI→PTE→CI	Indirect: -0.03 z=-0.26	(-6.85 , 0.52)
TTI→ES→MS	Indirect: -0.06 z=-0.43	Not computed
TTI→ES→CI	Indirect: -0.24 z=-0.62	Not computed

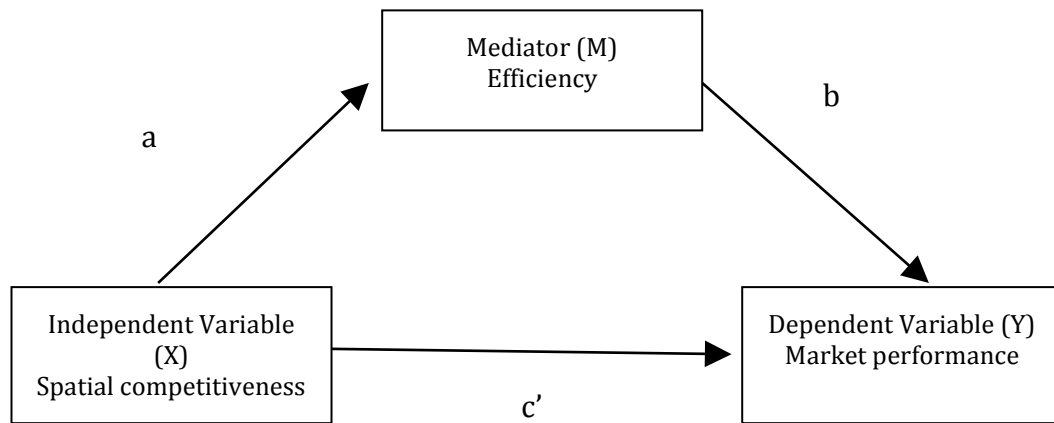
Source: Authors own elaboration. Original sample N=15. Level=95%. Bootstrap based on 999 replications.

Figure 1: Relationship among destination competitiveness, firm competitiveness and efficiency.



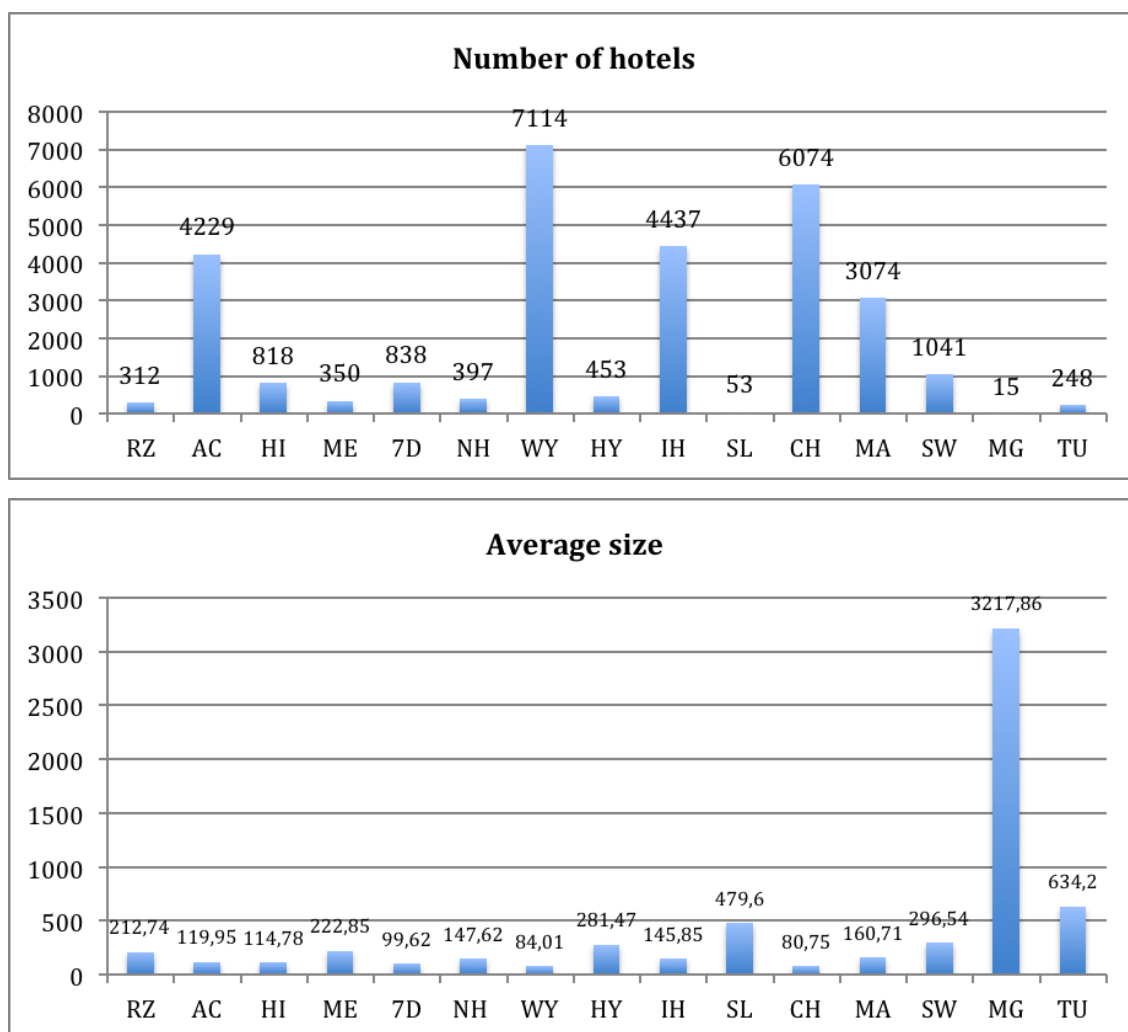
Source: Authors, based on Porter (1990)

Figure 2: Single mediator model for international hotel chains.



Source: Adapted from MacKinnon, Cheong and Pirlott (2012)

Figure 3. Number of hotels (top) and average sizes in terms of number of rooms (bottom) of the principal international hotel chains.



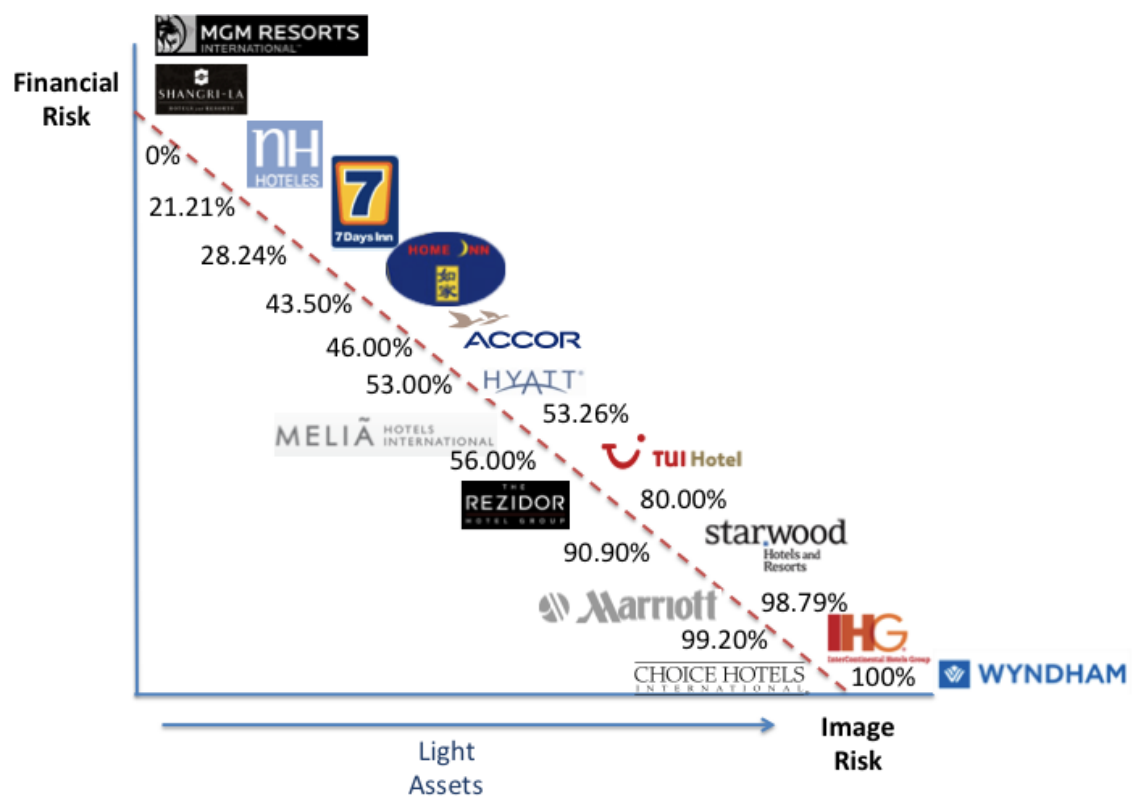
Source: Annual reports, compiled by the authors

Figure 4. Multibranding strategies for the studied international hotel chains.



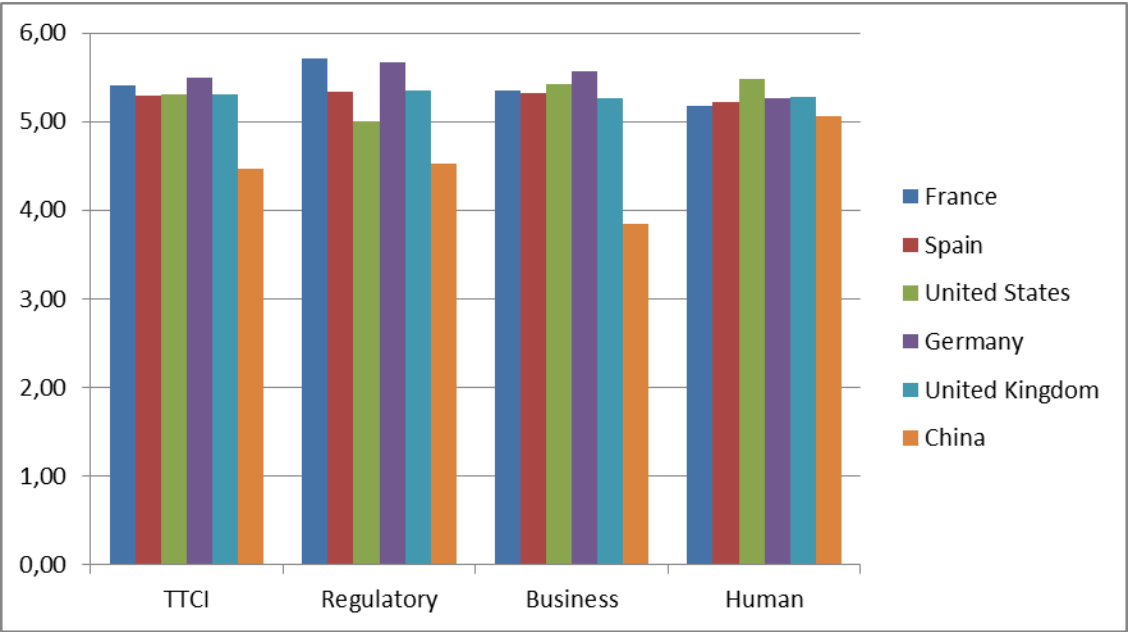
Source: Annual reports, compiled by the authors

Figure 5. Property structures of the studied international hotel chains.



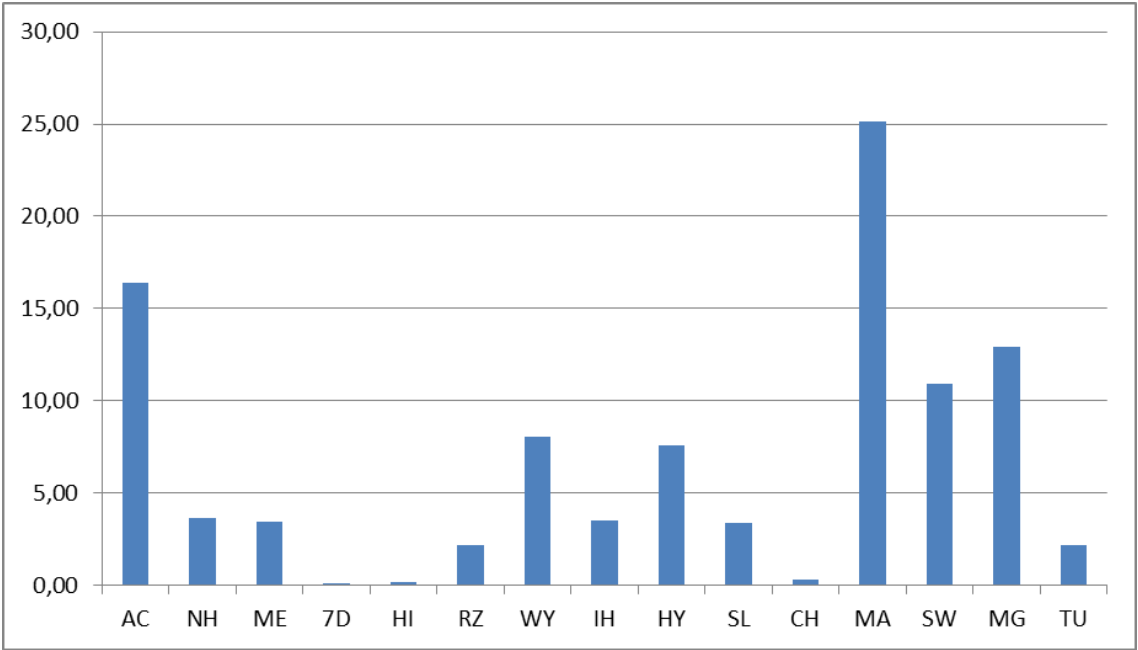
Source: Annual reports, compiled by the authors

Figure 6: Overall Tourism and Travel Competitiveness Index and its subindexes.



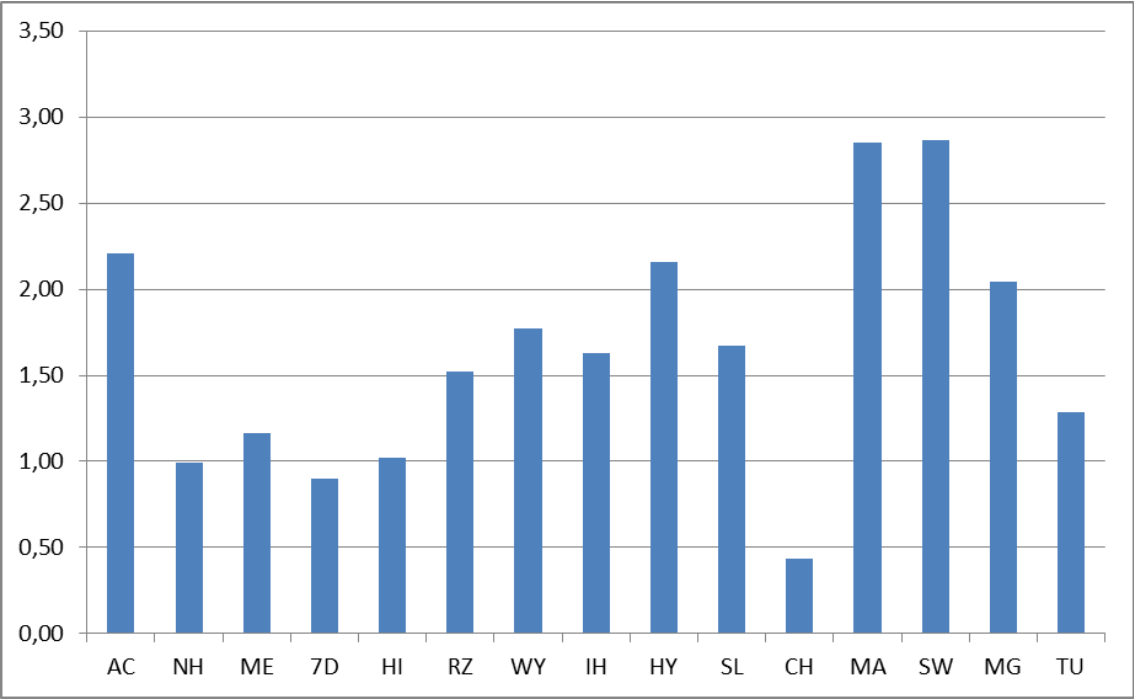
Source: World Economic Forum (2011)

Figure 7: Market performance of selected international hotel chains.



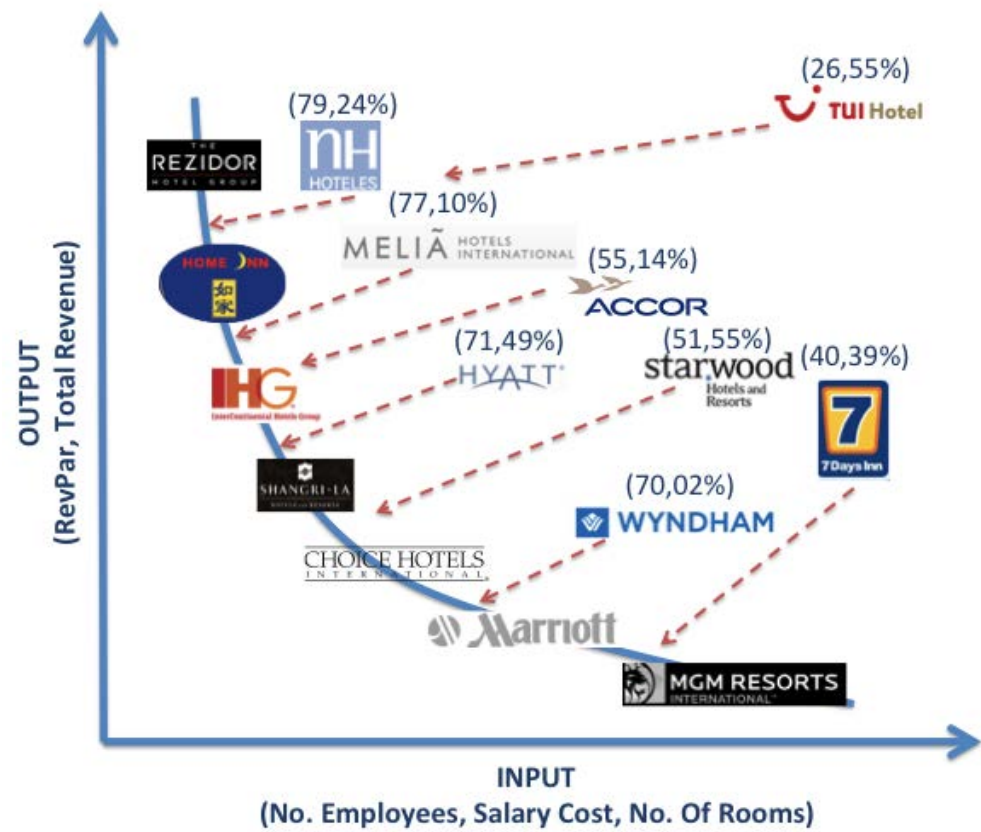
Source: Authors own elaboration

Figure 8: Firm competitiveness of selected international hotel chains, composite indicator.



Source: Authors own elaboration

Figure 9.- The efficiency isoquant of international hotel chains.



Source: Annual reports, compiled by the authors